

DETAILED ACTION

Acknowledgements

1. Acknowledgment is made of Applicants' amendment to the claims filed on 03 September 2009.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1 – 4 and 11 – 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Matsufuji, U.S. 5,913,950 ("Matsufuji"). Matsufuji discloses a power plant (E) and driveline arrangement (fig. 1) for a vehicle (1) having at least two wheel units and a body (1) supported on said wheel units comprising:

4. a longitudinally aligned engine (E) supported on said body;
5. a transmission (HST) supported on said body disposed on the underside of said engine;
6. a first means (105) for transferring drive from an output shaft (16) of said engine to an input shaft (12) of said transmission;
7. a second means (85) for transferring drive from an output shaft (13) of said transmission to forwardly and rearwardly projecting output shafts;
8. a first wheel carrier (18) supported on said body forwardly of said second drive transferring means, having an input shaft (19) drivingly coupled to said forwardly projecting

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output shaft of said second drive transferring means, and a pair (18) of laterally projecting half shafts operatively connected to the wheels of a first wheel unit (20); and

9. a second wheel carrier (28) supported on said body rearwardly of said second drive transferring means, having an input shaft (43) drivingly coupled to said rearwardly projecting output shaft of said second drive transferring means, and a pair (28L and 28R) of laterally projecting half shafts operatively connected to the wheels of a second wheel unit (21).

10. In reference to claims 2 – 4, and 11 – 16, Matsufuji further discloses a third means (C) for transferring drive operatively interconnecting said transmission output shaft and said second means for transferring drive, selectively operable to transmit a first drive (C), a second drive (68) or no drive; including a pair (42 and 43) of longitudinally disposed drive shafts, one operatively interconnecting an output shaft (42) of said second drive transferring means and said input shaft of said first carrier, and the other one operatively interconnecting an output shaft (43) of said second drive transferring means and said input shaft of said second carrier; including a hydraulic system (P) for operating selected systems on said vehicle, having a motor (M) drivingly connected to said first drive transferring means; wherein said second drive transferring means is operable selectively to provide differential drive between said first and second carrier and to lock to evenly provide drive to said first and second carriers; wherein said second drive transferring means is operable to provide differential drive between said first and second carriers; wherein said second drive transferring means is operable to provide inter-axle differential drive; wherein said couplings of said shafts comprise gear couplings; wherein said couplings of said drive shafts comprise gear couplings; including a selectively operable brake (G) operatively connected to said second drive transferring means.

Claim Rejections - 35 USC § 103

11. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

12. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsufuji in view of Evans et al. U.S. 2003/0186768 ("Evans"). Matsufuji does not directly disclose the details of the engine used. Evans teaches a diesel engine (6). Evans further teaches a turbine engine (244). It would have been obvious for a person having ordinary skill in the art at the time the invention was made to modify Matsufuji such that it comprised the engine in view of the teachings of Evans so as to provide an internal combustion power plant that is powerful enough to drive larger trucks or work vehicles [0045].

13. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsufuji in view of Gradu, U.S. 2003/0144109 ("Gradu"). Matsufuji does not directly disclose the transferring means operative to proportion transmitted torque. Gradu teaches a drive transferring means (8) is operative to proportion transmitted torque, 30% to a first carrier and 70% to a second carrier (fig. 5). It would have obvious for a person having ordinary skill in the art at the time the invention was made to modify Matsufuji such that it comprised the drive transferring means operative to proportion transmitted torque in view of the teachings of Gradu so as to selectively apportion torque to front driving wheels and rear driving wheels that can be varied and controlled.

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14. Claims 19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsufuji in view of Ima, U.S. 6,729,992 ("Ima"). Matsufuji does not directly disclose the details of the first carrier. Ima teaches each of said carriers is provided with an inter-wheel differential. Ima further teaches a pair of disc brake assemblies (fig. 3) mounted on each of said carriers, and wherein each of said assemblies is operatively connected to a half shaft (fig. 8). It would have been obvious for a person having ordinary skill in the art at the time the invention was made to modify Matsufuji such that it comprised inter-wheel differentials in both carriers and in view of the teachings of Ima so as to run smoothly on a bad road and enhance fuel economy (column 1, line 59).

15. Claims 24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ima in view of Matsufuji. Ima discloses a power plant and driveline arrangement for a vehicle having at least two wheel units and a body supported on said wheel units comprising (column 1, line 22):

16. a longitudinally aligned engine (3) supported on said body;

17. a transmission (13) supported on said body;

18. a first means (7) for transferring drive from an output shaft (6) of said engine to an input shaft (5) of said transmission;

19. a second means for transferring drive (15) from an output shaft (41) of said transmission to forwardly and rearwardly projecting output shafts;

20. a first wheel carrier (4) supported on said body forwardly of said second drive transferring means, having an input shaft (41) drivingly coupled to said forwardly projecting output shaft of said second drive transferring means, and

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21. a pair of laterally projecting half shafts (8) operatively connected to the wheels of a first wheel unit; and a second wheel carrier (16) supported on said body rearwardly of said second drive transferring means, having an input shaft (17) of drivingly coupled to said rearwardly projecting output shaft of said second drive transferring means, and

22. a pair of laterally projecting half shafts (25) operatively connected to the wheels of a second wheel unit; and

23. a third carrier (10) supported on said body rearwardly of said second carrier, having an input shaft (14) drivingly coupled to an output shaft (18) of said second carrier, and pair of laterally projecting half shaft operatively connected to a set of wheels (12) of a wheel unit (10).

24. Ima does not directly disclose the transmission disposed on the underside of said engine. Matsufuji teaches a transmission (HST) disposed on the underside of an engine (E). It would have been obvious for a person having ordinary skill in the art at the time the invention was made to modify Ima such that it comprised the transmission disposed on the underside of an engine in view of the teachings of Matsufuji so as to leave room for the undercarriage a space for the transmission line providing a more compact length of the vehicle, an arrangement old and well known in the art.

25. In reference to claim 26, Ima in view of Matsufuji further discloses a set of longitudinally disposed drive shafts (fig. 1), one operatively interconnecting an output shaft (37) of said second drive transferring means and said input shaft of said first carrier, one operatively interconnecting an output shaft (63) of said second drive transferring means and said input shaft of said second carrier and one operatively interconnecting an output shaft (87) of said second carrier and an input shaft (14) of said third carrier.

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26. Claims 35, 36, and 46 – 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ima in view of Matsufuji and Clark, U.S. 3,471,166 (“Clark”). Ima discloses a power plant (3) and driveline arrangement for a vehicle having at least two wheel units and a body supported on said wheel units (column 3, line 39), comprising:

27. a longitudinally aligned engine (3) supported on said body;

28. a transmission (CVT) supported on said body;

29. a first means for transferring drive (7) from an output shaft (6) of said engine to an input shaft (5) of said transmission;

30. a second means for transferring drive from an output shaft (41) of said transmission to forwardly and rearwardly projecting output shafts (63);

31. a first carrier (4) supported on said body forwardly of said second drive transferring means, having an input shaft (41) drivingly connected to said forwardly projecting shaft of said second drive transferring means and a pair of laterally projecting half shafts (8) operatively connected to the wheels of a wheel unit (4);

32. a second carrier (16) supported on said body rearwardly of said second drive transferring means, having an input shaft (17) drivingly coupled to said rearwardly projecting output shaft of said second drive transferring means, and a pair of laterally projecting half shafts (25) operatively connected to wheels of a wheel unit (16);

33. a third carrier (10) supported on said body rearwardly of said second carrier, having an input shaft (14) drivingly coupled to an output shaft (18) of said second carrier and a pair of laterally projecting half shafts (11) operatively connected to wheels of a wheel unit (10).

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34. Ima does not directly disclose the transmission disposed on the underside of said engine. Matsufuji teaches a transmission (HST) disposed on the underside of an engine (E). It would have been obvious for a person having ordinary skill in the art at the time the invention was made to modify Ima such that it comprised the transmission disposed on the underside of an engine in view of the teachings of Matsufuji so as to leave room for the undercarriage a space for the transmission line providing a more compact length of the vehicle, an arrangement old and well known in the art.

35. Ima does not disclose a fourth carrier supported on said body forwardly of said first carrier, having an input shaft drivingly coupled to an output shaft of said first carrier, and a pair of laterally projecting half shafts operatively connected to wheels of a wheel unit. Clark teaches a fourth carrier (74) supported on said body forwardly of a first carrier (37 or 41), having an input shaft (89) drivingly coupled to an output shaft, and a pair of laterally projecting half shafts (73) operatively connected to wheels of a wheel unit (78). It would have been obvious for a person having ordinary skill in the art at the time the invention was made to modify Ima such that it comprised a fourth carrier in view of the teachings of Clark so as to provide free movement of all the wheels without strain and equal distribution of load and driving torque (column 6, line 47).

36. In reference to claim 36, Ima as modified by Matsufuji and Clark further discloses a third means (16) for transferring drive operatively interconnecting said transmission output shaft and said second means for transferring drive, selectively operable to transmit drive at a first speed, transmit drive at a second speed and transmit no drive in a neutral position (column 3, line 39).

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37. In reference to claim 46, Ima discloses a power plant (3) and driveline arrangement for a vehicle having at least two wheel units and a body supported on said wheel units (column 3, line 39), comprising:

38. a longitudinally aligned engine (3) supported on said body;

39. a transmission (CVT) supported on said body;

40. a first means for transferring drive (7) from an output shaft (6) of said engine to an input shaft (5) of said transmission;

41. a second means for transferring drive from an output shaft (41) of said transmission to forwardly and rearwardly projecting output shafts (63);

42. a first carrier (4) supported on said body forwardly of said second drive transferring means, having an input shaft (41) drivingly connected to said forwardly projecting shaft of said second drive transferring means and a pair of laterally projecting half shafts (8) operatively connected to the wheels of a wheel unit (4);

43. a second carrier (16) supported on said body rearwardly of said second drive transferring means, having an input shaft (17) drivingly coupled to said rearwardly projecting output shaft of said second drive transferring means, and a pair of laterally projecting half shafts (25) operatively connected to wheels of a wheel unit (16);

44. a third carrier (10) supported on said body rearwardly of said second carrier, having an input shaft (14) drivingly coupled to an output shaft (18) of said second carrier and a pair of laterally projecting half shafts (11) operatively connected to wheels of a wheel unit (10).

45. Ima does not directly disclose the transmission disposed on the underside of said engine. Matsufuji teaches a transmission (HST) disposed on the underside of an engine (E). It would

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have been obvious for a person having ordinary skill in the art at the time the invention was made to modify Ima such that it comprised the transmission disposed on the underside of an engine in view of the teachings of Matsufuji so as to leave room for the undercarriage a space for the transmission line providing a more compact length of the vehicle, an arrangement old and well known in the art.

46. Ima does not disclose a fourth carrier supported on said body rearwardly of said first carrier, having an input shaft drivingly coupled to an output shaft of said first carrier, and a pair of laterally projecting half shafts operatively connected to wheels of a wheel unit. Clark teaches a fourth carrier (41) supported on said body rearwardly of a first carrier (37 or 74), having an input shaft (55) drivingly coupled to an output shaft, and a pair of laterally projecting half shafts (40) operatively connected to wheels of a wheel unit (41). It would have been obvious for a person having ordinary skill in the art at the time the invention was made to modify Ima such that it comprised a fourth carrier in view of the teachings of Clark so as to provide free movement of all the wheels without strain and equal distribution of load and driving torque (column 6, line 47).

47. In reference to claim 47, Ima discloses a power plant (3) and driveline arrangement for a vehicle having at least two wheel units and a body supported on said wheel units (column 3, line 39), comprising:

48. a longitudinally aligned engine (3) supported on said body;

49. a transmission (CVT) supported on said body;

50. a first means for transferring drive (7) from an output shaft (6) of said engine to an input shaft (5) of said transmission;

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51. a second means for transferring drive from an output shaft (41) of said transmission to forwardly and rearwardly projecting output shafts (63);

52. a first carrier (4) supported on said body forwardly of said second drive transferring means, having an input shaft (41) drivingly connected to said forwardly projecting shaft of said second drive transferring means and a pair of laterally projecting half shafts (8) operatively connected to the wheels of a wheel unit (4);

53. a second carrier (16) supported on said body rearwardly of said second drive transferring means, having an input shaft (17) drivingly coupled to said rearwardly projecting output shaft of said second drive transferring means, and a pair of laterally projecting half shafts (25) operatively connected to wheels of a wheel unit (16);

54. a third carrier (10) supported on said body rearwardly of said second carrier, having an input shaft (14) drivingly coupled to an output shaft (18) of said second carrier and a pair of laterally projecting half shafts (11) operatively connected to wheels of a wheel unit (10).

55. Ima does not directly disclose the transmission disposed on the underside of said engine. Matsufuji teaches a transmission (HST) disposed on the underside of an engine (E). It would have been obvious for a person having ordinary skill in the art at the time the invention was made to modify Ima such that it comprised the transmission disposed on the underside of an engine in view of the teachings of Matsufuji so as to leave room for the undercarriage a space for the transmission line providing a more compact length of the vehicle, an arrangement old and well known in the art.

56. Ima does not disclose a fourth carrier supported on said body forwardly of said first carrier, having an input shaft drivingly coupled to an output shaft of said first carrier, and a pair

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of laterally projecting half shafts operatively connected to wheels of a wheel unit. Clark teaches a fourth carrier (74) supported on said body forwardly of a first carrier (37 or 41), having an input shaft (89) drivingly coupled to an output shaft, and a pair of laterally projecting half shafts (73) operatively connected to wheels of a wheel unit (78). Clark further teaches a fifth carrier (39) supported on said body rearwardly of a third carrier (37 or 41) having an input shaft (55) driving coupled to an output shaft (50) of said third carrier and a pair of laterally projecting half shafts (38). It would have been obvious for a person having ordinary skill in the art at the time the invention was made to modify Ima such that it comprised a fourth carrier and fifth carrier in view of the teachings of Clark so as to provide free movement of all the wheels without strain, for equal driving torque, for a greater distribution of load, and greater load capacity.

57. In reference to claim 48, Ima in view of Matsufuji and Clark further discloses a third drive means (16) for transferring drive operatively interconnecting said transmission output shaft and said second means for transferring drive, selectively operable to transmit drive at a first speed, transmit drive at a second speed and transmit no drive in a neutral position (column 3, line 39).

Response to Arguments

58. Applicant's arguments with respect to claims 1, 24, 35, 46, and 47 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

59. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KAREN JANE J. AMORES whose telephone number is (571)272-6212. The examiner can normally be reached on Monday through Friday, 8:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Dickson can be reached on (571)-272-7742. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

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